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10/529,315	03/29/2005	Dennis Teer	2253/150	8646

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EXAMINER	
BERMAN, JASON	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/529,315	TEER, DENNIS	
	Examiner	Art Unit	
	Jason M. Berman	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *3/25/05*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 March 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/25/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 26 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claim 26, the term "metal intensity" is used. No definition for this term is given in the claims or specification and it does not appear to be one of common use in the field. Also, no indication is given as to how the level of reactive gas is selected with respect to this undefined property in either the claim or the specification.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3, 7-12, 18-21 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Goedicke (6,315,877).

As to claim 1, Goedicke discloses an apparatus for the application of a coating material comprising at least first and second layers of material, said apparatus comprising:

- at least first and second magnetrons from which material can be selectively applied (Figure 1: showing magnetrons labeled '2');
- a substrate holder, on which the substrates to be coated are held (Figure 1: showing parts 5 [substrates] on fixtures 4);
- positioned between the magnetrons and the substrate holder, is at least one shield (Figure 1: showing screens 10 and 10');
- said shield including at least one aperture through which material deposited from a magnetron can pass for application onto the substrates (Figure 1: showing screens 10 and 10' having openings [indicated by broken line]); and
- when the aperture is suitably positioned with respect to the said magnetron and substrate holder by selective rotation of the shield with respect to the magnetrons so as to define a passage through which the material deposited from the target of said magnetron can pass (Figures 3A-3C: showing rotation of screens 10 and 10' to allow deposition from selected magnetron source).

As to claim 2, Goedicke discloses when the aperture is not in front of a particular magnetron, deposition of the material onto the substrates from that magnetron is prevented or at least significantly reduced (Figure 3B: showing use of screen to prevent desired magnetron sources from reaching substrates).

As to claim 3, Goedicke discloses the shield is rotatable so that the aperture moves from a position in front of a first magnetron to a position in front of a second

magnetron and so on in sequence to provide a multi layered coating (col 6 lines 55-60: rotatable screens to select which sputtering source reaches substrate).

As to claim 7, Goedicke discloses the substrates are mounted on the holder which is rotatable (col 6 lines 33-35: fixtures 4 rotate).

As to claim 8, Goedicke discloses the shield is replaced by two shields with one positioned inside the other, having a common axis of rotation and each having at least one aperture therein (figure 1: showing rotatable screens 10 and 10').

As to claim 9 Goedicke discloses the shields are cylindrical and concentric with the substrate holder, and rotate about a common axis of rotation (figure 1: showing rotatable screens 10 and 10').

As to claim 10, Goedicke discloses the shields are selectively rotated to bring the apertures in each into line and define a passage for the deposition of material from a magnetron target through when positioned in front of said target (figures 3A-3C showing positioning of screens to allow deposition from magnetrons 2).

As to claim 11 Goedicke discloses the shields are selectively positioned so as to prevent material passing through the apertures and onto the substrates during the preparation of the magnetron targets (Figure 3a; col 7 lines 27-30: positioning of screens during heating phase to cover all magnetron sources).

As to claim 12, Goedicke discloses a method for controlling the application of a multilayered coating onto at least one substrate in a coating chamber, said method comprising

- positioning a plurality of magnetrons with targets of material to be deposited in the coating chamber to face towards a substrate holder in the chamber (Figure 1: showing sputtering magnetrons 2 positioned towards substrate holders 4);
- interposing between the substrate holder and the magnetrons, first and second shields (figure 1: showing screens 10 and 10' between magnetrons and substrate holders);
- providing in said shields at least one aperture which, when selectively positioned with respect to a magnetron, allows material deposited from the magnetron target to pass through and onto the substrates (Figure 1: showing screens 10 and 10' with apertures, illustrated in Figures 3a-3c as being rotatable to allow deposition from selected magnetrons);
- the shields are selectively rotatable so as to move and position the respective apertures to define a passage for selected periods of time to allow the passage of material deposited from a magnetron target (Figure 1: showing screens 10 and 10' with apertures, illustrated in Figures 3a-3c as being rotatable to allow deposition from selected magnetrons); and
- then to move the shields to repeat the same as required with respect to the first and second magnetrons as required to apply the multilayered coating onto the substrates (col 4 lines 40-43: several layers coated onto the substrates by the magnetron setup as illustrated in figure 1).

As to claim 18, Goedicke discloses a reactive gas introduced into the coating chamber during the coating procedure to allow the deposited material to form a compound material on the substrate (abstract: use of a reactive gas inlet in sputtering chamber).

As to claim 19, Goedicke discloses a conditioning step prior to operation of the shields to form deposition passages, during which material is deposited from the targets and the shields are positioned to prevent material from the targets reaching the substrate (col 7 lines 25-30: “heating” process with screens covering magnetron sources).

As to claim 20, Goedicke discloses the relative positions of the shields when forming a passage for the deposited material from a magnetron target are selected to define the width of the passage defined by the apertures (Figure 3b: showing alignment of screens 10-10" to create a width equal to the apertures in screens 10 and 10’).

As to claim 21, Goedicke discloses the apertures are positioned in line to define a full width passage (Figure 3b: showing alignment of screens 10-10" to create a width equal to the apertures in screens 10 and 10’).

As to claim 23, Goedicke discloses

- A method for the control of operation of apparatus for applying a coating onto at least one substrate (abstract: sputter application of coatings onto a plurality of parts);
- Said coating comprising a series of layers (col 4 lines 40-42);

- An apparatus including within a coating chamber at least two magnetrons for the selective deposition of material from magnetron targets onto the substrates (Figure 1: showing 3 pairs of magnetron sputter sources, all labeled 2);
- A plurality of cylindrical shields positioned between the targets and the substrate holder (figure 1: showing screens 10 and 10')
- The shields including apertures which can be selectively positioned to define a passage for deposited material from the targets onto the substrates (figure 1: showing screens with apertures [broken portion of solid line]);
- Preparing the targets by operating the magnetrons to deposit material from the targets in the coating chamber and positioning the shields to prevent the passage of deposited material onto the substrates (Figure 3A: showing “warm up” pre-sputtering shield configuration); and
- Applying a predetermined power level to the magnetrons and maintaining said power level during the application of the deposited material onto said substrates and the apertures in the shields are selectively positioned to allow the selective application of the material onto the substrates through passages defined by the apertures (Figure 1: showing power supply 7 for supplying power to magnetrons 2; col 6 lines 40-41: use of power before coating begins; figures 3a – 3c: positioning of shields to allow coating by magnetrons through apertures in the shields).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 4-5, 13, 16-17 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goedicke, as applied to claims 1, 12 and 20 above, and further in view of Nomura (US 2002/0064595).

As to claim 4, Goedicke is silent as to a coating with alternate materials from the first and second magnetron.

Nomura discloses an apparatus for sputter deposition including multiple targets and a double layer rotatable shield positioned between the targets and the substrate (abstract; figure 4). Nomura also discloses the rotation of the double shield to align apertures to selectively sputter alternate materials from multiple sputtering sources (paragraph 58: hole of each shutter plate aligning to sputter for a predetermined time, following by further shutter manipulation for next sputtered layer). This method is

disclosed as allowing for the formation of multilayered films within a single chamber without contamination (paragraph 59).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to coat the substrate with alternate layers of material from a first and second source, as disclosed in Namura, with the magnetron sputtering apparatus of Goedicke, in order to form multiple layers in a single chamber without contamination.

As to claim 5, Goedicke is silent as to the thickness of the individual layers of material being controlled by the power applied to the magnetron or the time of a shield aperture being positioned in front of that particular magnetron.

Nomura discloses the sputtering of a target for a predetermined time by controlling a shutter mechanism in front of that target (paragraph 58). This time will inherently control the thickness of the sputtered layer.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to control the time of a shield being positioned in front of a particular target, as disclosed by Nomura, with the magnetron sputtering apparatus of Goedicke, because electronic devices require precise properties dependant upon layer thickness.

As to claim 13, Goedicke is silent as to the magnetrons being continuously operated during the deposition process to deposit material from the respective target and when the apertures of the shields are not positioned to define a passage for the material the material applies to the wall of the shield.

Nomura discloses multiple sputtering targets operated continuously while being blocked from the substrate by a shield (paragraph 58; shown in figure 4 – inherently involving the active target depositing upon the part of the shield facing them). Continuous operation during positioning of the shield allows for increased productivity (paragraph 62).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to continuously operate the targets, as disclosed by Nomura, in the magnetron sputtering method of Goedicke, because efficiency is increased when startup times are reduced.

As to claim 16, Nomura discloses the movement of the shields is stepwise with a selected dwell time of the shields to allow a deposition of the material from a target over a period of time (paragraph 58: alignment of shields over a selected for a period of time, then subsequent shutter manipulation for another sputtering target selection).

As to claim 17, Nomura discloses the shields are selectively moved between dwell times to define the deposition configurations as required (paragraph 58).

As to claim 22, Goedicke discloses the rotation of two different shields to align apertures to allow a passage for sputtering, but does not explicitly disclose the apertures are offset to define a passage of a width less than that of the largest aperture.

Nomura discloses a method of continuously sputtering multiple targets while rotating a double shield structure to align apertures with a selected target (paragraph 58). Nomura also discloses the configuration of the shields to include operation while the apertures are offset and thereby create an opening less than that of the total width

of the apertures (figure 5b- showing offset apertures 61a and 62a exposing target 35). This method of operation is disclosed as increasing productivity and reducing contamination.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to define a passage less than the width of the apertures with offset shield openings, as disclosed by Nomura, in the method of magnetron sputtering of Goedicke, because the double shield rotation method allows for a reduction in contamination.

8. Claim 6 rejected under 35 U.S.C. 103(a) as being unpatentable over Goedicke, as applied to claim 1 above, and further in view of Teer (GB 2,258,343).

As to claim 6, Goedicke is silent as to the use of a closed field unbalanced magnetron configuration.

Teer discloses a magnetron sputtering apparatus with multiple magnetrons (abstract; figure 1). Teer also discloses the use of a closed field unbalanced magnetron configuration which substantially traps all electrons generated in the system (abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a closed field unbalanced magnetron configuration, as disclosed by Teer, in the apparatus of Goedicke, because such a configuration traps all electrons within the system increasing ion bombardment.

9. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goedicke, as applied to claim 12 above, and further in view of Hill (US 5,454,919).

As to claim 14, Goedicke is silent as to magnetrons moved to a shut down or standby condition.

Hill discloses a method of depositing multiple layers on a substrate within a single chamber using multiple sputtering targets (abstract). Hill also discloses the moving of a sputtering target to a standby level when not in active use (col 5 lines 46-50).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to move a non-active target to a standby condition, as disclosed by Hill, in the magnetron sputtering method of Goedicke, because a standby condition allows for preservation of the material of the sputtering target while keeping the target in a state of readiness (Hill at col 5 lines 49-50).

10. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goedicke, as applied to claim 12 above, and further in view of Bodway (US 3,515,663).

Goedicke is silent as to the shields being rotated at a speed which can be varied or fixed.

Bodway discloses a method of sputtering with the use of a shutter and shield between the substrate and target (figure 7). Bodway also discloses the rotation of the shutter at a constant speed to obtain alternating layers on the substrate from each of the targets (col 3 lines 22-30).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to rotate the shutter at a constant speed, as disclosed by Bodway,

in the method of magnetron sputtering of Goedicke, because continuous alternation between target sources allows for fast formation of alternating layers on the substrate.

11. Claims 24-25 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goedicke, as applied to claim 23 above, and further in view of Ikeo (JP 63-176465).

As to claim 24, Goedicke discloses the use of magnetron reactive deposition (abstract), but is silent as to the reactive gas being introduced after the target preparation steps have been completed.

Ikeo discloses a method of sputter deposition in which a target is presputtered and subsequently the reaction gas is flowed into a chamber (abstract). Ikeo also discloses the use of a shutter plate between the substrate and target which is not removed until saturation of reaction gas flow rate (abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to introduce the reactive gas after the presputtering step, as disclosed by Ikeo, in the method of magnetron sputtering of Goedicke, because a target is more effectively cleaned in the presence of inert gas.

As to claim 25, Goedicke discloses apertures in the shields being selectively positioned to allow the selective application of the material onto the substrates through the passages defined by the apertures (figures 3a – 3c: positioning of shields to allow coating by magnetrons through apertures in the shields).

As to claim 32, Ikeo discloses stable operating conditions are established prior to deposition onto the substrates by positioning of shields to prevent passage of material onto the substrate (abstract).

12. Claims 27-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goedicke in view of Ikeo, as applied to claim 24 above, and further in view of Felts (US 4,888,199).

As to claim 27, Goedicke is silent as to monitoring means provided in the chamber and when the appropriate gas level is reached to match a predetermined value the same is monitored for a period of time to ensure the same is stable and if so the gas continues to flow at the same rate.

Felts discloses a method of depositing a thin film by magnetron sputtering (abstract, col 13 lines 15-17). Felts also discloses monitoring the gas in the chamber and comparing said measurements to a predetermined value to adjust the gas flow rates (abstract: monitoring plasma; claim 12, using monitored gas species values to adjust flow rates). A monitoring and control system is effective for obtaining a uniform thin film (col 2 lines 29-30).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a gas monitor, as disclosed by Felts, in the method of magnetron sputtering of Goedicke in view of Ikeo, because control systems allow for the deposition of a uniform film.

As to claim 28, Felts discloses the gas control method includes mass spectrometer control of gas partial pressures (col 2 lines 15-16: use of spectrometer to alter plasma; claim 12: adjusting flow rates).

As to claim 29, Felts discloses OEM is used to control the gas flow (abstract: plasma optical emission is monitored).

As to claim 30, Felts discloses OEM is used to control the reactive gas flow at the required level for a stoichiometric coating to be applied to the substrates (abstract; col 5 lines 52-54: flow ensures unreacted gas present [inherently driving any reaction to stoichiometric conclusion]).

13. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goedicke in view of Ikeo, as applied to claim 24 above, and further in view of Gorokhovsky (WO0062327 and US 6,645,354).

Goedicke in view of Ikeo discloses a preparation stage and subsequent deposition, but are silent as to the power level applied to the magnetron being higher during the preparation stage.

Gorokhovsky discloses a method of magnetron sputtering (abstract). Gorokhovsky also discloses the use of a higher power during the presputter cleaning stage than the deposition stage (col 20 lines 15-18).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a higher presputtering power, as disclosed by Gorokhovsky, in the method of magnetron sputtering of Goedicke in view of Ikeo, because a higher power results in fast and effective cleaning of the target.

Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Berman whose telephone number is (571)270-5265. The examiner can normally be reached on M-R 8am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571)272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kishor Mayekar/
for Jason Berman, Primary
Examiner of Art Unit 1795

/J. M. B./
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